ALCAS Corner (Australian LCA Society)

Water Issues in Australia – An LCA Perspective

Summary of presentations made at the ALCAS LCA Roundtable held Wednesday 7th May 2003

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Introduction

Living on the driest inhabited continent on earth, Australians need to critically address, monitor, and manage water systems, the supply and use of water, and wastewater management in Australia. In recent years, many areas in Australia have been affected by drought. The capacity of water levels in the reservoirs that service metropolitan Melbourne are currently at 40% capacity. On Wednesday 7th, May 2003, ALCAS held its latest LCA Roundtable, this time centred upon water issues. The topics of the presentations spanned from the aluminium industry, to water authorities, green buildings, and urban water systems. This ALCAS column will summarise the main issues presented on this occasion.

1 Measuring Water Usage in the Aluminium Industry

JOHN PULLEN from ALCOA Australia presented 'Case Study in LCI data collection for water usage'. He gave examples of the data collection issues currently being faced by the aluminium industry in respect to global water usage. This case study demonstrates that care needs to be taken in the collection and use of LCI data referring to water usage and the definitions given to specific water flows.

2 Modelling Urban Water Systems

GRACE MITCHELL from the CSIRO Urban Water unit spoke about 'Water & Contaminant Balance Analysis of Innovative Water Servicing Approaches'. She gave an overview of the modelling program that has been developed by CSIRO Urban Water to assess scenarios such as (i) availability of storm water and wastewater, (ii) water demands of an area, (iii) alternative water supply and disposal practices, (iv) contaminant loads discharged from the urban water system, and (v) build up of contaminants within the water system e.g., recycle stream/garden. Information that is used in the model includes climate data such as rainfall, evaporation, hydrologic parameters, land use and population, daily stormwater flows and water usage. Information on contaminant concentrations or loads, water quality from standard treatment processes and water quality standards and guidelines are also inputted into the model. Grace presented results from a case study in Brisbane (Queensland) to illustrate how the modelling can be used. The objectives of the study were as follows: (i) minimise the amount of potable water imported to the site, (ii) minimise wastewater (treated and untreated) discharges from the site, (iii) mimic natural storm flows, and (iv) maintain or enhance the potential value of the development. Three scenarios were modelled.

Compared with the baseline scenario there were savings in all of the three scenarios with savings in reticulated water ranging from 77%–100%, wastewater discharge savings from 25%–100%, stormwater volume savings from 8%–27%, savings in total nitrogen loads from 30%–35%, savings in total phosphorus loads from 16%–47%, and total suspended solids load savings from 3%–14%. Total infrastructure costs were also calculated for the different scenarios along with social impact analysis.

3 Water and Energy Synergies and Trade-offs in the 60L Green Building

ALAN PEARS from Sustainable Solutions presented 'The 60L Green Building: water and energy – synergies and trade-offs'. The 60L green building is a 3600 square metre 4 storey office building in inner Melbourne with the intention to be a leader in building environmental performance, including management of water and sewage. It currently has 80% occupancy. The building has been designed to:

- Use collected rainwater to replace mains water
- Use 100% on-site treatment and re-use of grey and black water streams
- Maximise water efficiency
- Achieve other environmental principles:
  - Energy efficiency
  - Avoid chemicals
  - Use environmentally preferable materials
  - Maintain safe water quality

There are also monitoring and reporting systems to track and optimise performance and the building creates excess treated water that could be utilised by others if community systems were in place. Alan also provided an overview of the development process of the fit-out of the building, the energy savings and lessons that have been learnt.

4 The Urban Water Cycle – A Perspective from Melbourne Water

Melbourne Water manages Melbourne's water supply catchments, removes and treats most of Melbourne's sewage and manages waterways and major drainage systems.

ERIK LIGTERMOET from Melbourne Water spoke about the reasons why LCA should be used: (i) to contribute to increased sustainability, (ii) balance across the triple bottom line) and (iii) incorporate the value of biodiversity services. The issues that need to be addressed include (i) the low price for water services, (ii) the high cost of options that increase sustainability, (iii) inbuilt conservatism, (iv) water is a limited natural resource and (v) the intrinsic value of biodiversity. Erik presented three options to mange the urban water cycle – conservative, radical and middle way concluding that all stakeholders need to work collaboratively together in understanding and manage the urban water cycle.

5 The Environmental Benefits of Residential Water Tanks

TIM GRANT from the Centre for Design RMIT University presented results from an LCA study conducted for Yarra Valley Water that investigated the environmental benefits of residential water tanks. Two scenarios were modelled: a 600 litre plastic tank for watering the garden and a 2,250 litre plastic tank for watering the garden and toilet flushing. Both of these scenarios were compared with not having a tank. Rainfall data along with water consumption data was modelled for a typical Melbourne household. The findings indicated that there were mains water savings of between 8% (for the 600 litre tank) and 30% (for the 2,250 litre tank). In addition, there were savings in eutrophication related to the capture of nitrogen in the tanks that would then be applied to the home garden instead of ending up in the stormwater waste management flows. On the down side, the energy and material impacts to produce and run the tank over its life are not offset in energy terms by savings in water supply. However, the scale of the energy and material impacts for the tank are relatively low compared to overall Australian energy use, while the water saving are much more significant.

6 Sydney Water's LCA and Ecological Footprint

The final presentation was from GREGORY PETERS from the Sydney Water Corporation. The Ecological Sustainable Development challenge for Sydney Water is to provide clean and safe drinking water; provide sustainable water supplies; provide clean beaches, oceans, rivers and harbours; and ensure wise resource use and smart growth. Tools that Sydney Water uses include community consultation, environmental impact assessments, LCA, multi-criteria analysis, environmental risk analysis, and ecological footprint. Gregory provided an overview of the results of ecological footprint calculations and spoke about some of the findings from LCA research that investigated different water strategies and different technologies. Ecological footprint analysis provides a good communication tool for example in annual reporting. Whereas LCA provides a useful planning tool and from Sydney Water's perspective is good for strategic planning and options assessment.

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